

circulations are considered in the tenth chapter, and the question of the extent to which revolving fluid can be made to account for the observed phenomena is examined.

An interesting, and as yet incompletely solved, problem is presented by the mechanism of the conversion of radiant energy into the kinetic energy of the various atmospheric circulations. Undoubtedly, the primary cause of the general circulation is the unequal heating and cooling at different latitudes, operating through the temperature (and hence pressure) differences thereby engendered; while cyclones and anticyclones seem to be a necessary condition for the resulting interlatitudinal exchange of air, for this exchange, modified and complicated by numerous influences, does not take place in any regular and constant manner and is broken up into a series of secondary circulations. The energy of atmospheric circulations thus comes originally from the unequal heating at different latitudes, i. e., from major convection currents, but the processes, especially in the case of the secondary circulations, are not so simple and clear as imagined in the older theories. There is rather general agreement, however, that but little solar energy is transformed directly into kinetic energy—rather it is mostly stored up in some form of potential energy that subsequently, when conditions become right, is released in the kinetic form. Of the various conceivable immediate sources of the kinetic energy of storms, Margules found we must look to the inherent gravitational potential energy of position between adjacent masses of air

of different potential temperatures for the main supply, although under favorable circumstances latent heat of condensation is also an important source. In a state of dynamic equilibrium, warm and cold air may lie side by side without any disturbance arising—the potential energy capable of giving rise to a storm is present, but is not released until the conditions essential to the equilibrium are interfered with. This conception plays an important part in some modern theories of the cyclone.

Finally, in the eleventh and twelfth chapters, Exner reaches what is really the ultimate objective of theoretical meteorology—the problem of the actual sequence of day-to-day weather. In these chapters we find a wealth of valuable and interesting material which we can not here even mention in detail. The extensive accounts of the “tropfentheorie” or “barrier theory” of cyclone genesis and of the high “upper cyclones” of the Austrian school should be particularly interesting to American meteorologists, who are not in general very familiar with these ideas. Some striking instances of the value of aerological data to the interpretation of the phenomena on surface synoptic charts are given on pages 379–382.

In the final chapter are given the dynamical theories of gravitational waves at the interface between two strata of differing density; the diurnal variations of wind, pressure, and temperature; and the free vibrations of the atmosphere. Throughout the book, numerous references to the original literature are given; and a good index completes the volume.

THE “JANUARY THAW”

By ROSCOE NUNN

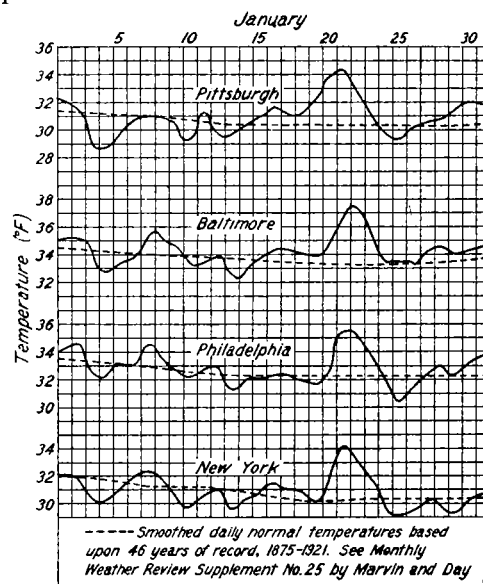
[Weather Bureau Office, Baltimore, Md.]

The popular belief in a “January thaw”—the more or less regular occurrence of a mild spell in the latter part of January—seems to find support in the temperature records of Baltimore and other stations in the Eastern States, from Georgia to New England. An examination of the Weather Bureau records of daily mean temperatures for the last 50 or 54 years discloses a marked crest in the graphs of the average daily mean temperatures for the three-day period, January 21–23, at Baltimore, Philadelphia, New York, Boston, Pittsburgh, Raleigh, and Atlanta. The crest is apparently most pronounced over the Middle and North Atlantic States. The accompanying graphs for Pittsburgh, Baltimore, Philadelphia, and New York show the prominence of the crest.

It is not the purpose of the writer to attempt to show that the “January thaw” is an established periodicity. Reliable and fairly homogeneous records for a half century show that it has occurred often enough to leave a marked impress upon the records for that period. Whether the succeeding 50 years shall tend to obliterate this crest, maintain it, or increase it, remains to be seen. The feature is a striking and interesting one in the Baltimore station records, although it may be of little value as an indication of future happenings.

“January thaw” was a saying many years before records of satisfactory authenticity had been established. It is mentioned by Greely in his “American Weather,” published in 1888. It is mentioned by W. M. Esten and C. J. Mason in a discussion of weather records for Storrs, Conn., published in September, 1910. However, but little has been published upon the subject, as shown by Talman in his compilation of references to literature concerning supposed irregularities in the annual march

of temperature, in the MONTHLY WEATHER REVIEW for August, 1919. Talman shows that the “January thaw” is popularly looked for in America, especially in New England. Apparently, the thaw has not been recognized in Europe.



The most comprehensive discussion of the general question of annual recurrences is found in a paper by Prof. C. F. Marvin, in the MONTHLY WEATHER REVIEW for August, 1919. Subsequently to this, in March, 1925, Professor Marvin wrote further on the subject, in a

letter, published in part as a footnote on page 126 in Ward's "Climates of the United States."

Considering particularly the Baltimore records, it is found that the average mean temperature for January, based upon the daily means for 53 years (1873-1925) is 34.3° . The average for the first decade is 34° ; second decade, 34.5° ; last decade, 34.5° . Taken by decades, the month would appear to average practically uniform in normal daily mean temperature, and, as a matter of fact, there are no very strong variations from day to day except for the period 21st-23d, inclusive.

The abrupt rise of 4° in this 53-year average, starting on the 20th and culminating on the 21st, and the persistence of mildness through the 22d, and, in a less marked degree, through the 23d, followed by a sharp drop of 2.5° on the 24th and almost uniformly normal conditions the last five days of January, form one of the most notable features of the temperature records of Baltimore. No other month shows anything like so pronounced a fluctuation from the long-period averages.

The three-day period, 21st-23d, averages 36.9° , which is 2.6° higher than the average for the month, 2.8° higher than for the three days preceding the 21st-23d, and 3.5° higher than for the succeeding three days.

If we take the two-day period, 21st-22d, it averages 37.4° , or 3.1° higher than the monthly normal, 3.3° higher than the preceding three days, and 4.0° higher than the succeeding three days.

This high average for the period, January 21-23, is not due to a few very warm days on these dates. These days were frequently mild, as shown by the following: The two days, 21st and 22d, taken together averaged above normal 35 times out of 55, or 64 per cent; the 21st alone averaged above normal 74 per cent, and the 22d alone, 69 per cent.

But while the average shows up this strongly for frequency of occurrence, there were strong variations in the frequency within the 55 years. Frequency was high during the first 8 years (1873 to 1880); very low from 1881 to 1893, with only two occurrences in the 13 years;

very high from 1894 to 1917, with 19 occurrences in the 24 years; fairly frequent for the last decade, 1918 to 1927, with 6 occurrences in the 10 years.

Dividing the record of 55 years into halves, we find that at Baltimore the temperature averaged above normal for the period January 21-23, during the first half (1873-1899), 16 times, or 57 per cent; for the second half (1900-1927), 19 times, or 70 per cent.

No explanation of the cause of the abnormality has ever been offered, so far as the writer knows. It may be worth remarking that it comes just after the head of winter and seems to attend the initiation of lengthening days and the first pulsation toward spring. The mind holds to the belief that such irregularities are temporary and are smoothed out in the course of time; that records for some hundreds of years will give an annual temperature curve devoid of irregularities. As stated by Professor Marvin, "The human mind knows no reason why there should be an irregularity of this character; we are compelled to think of the normal temperature as a smooth progressive curve."

The immediate cause of each occurrence of the spell is readily seen from an examination of the weather maps. It is almost needless to say that they are caused by low-pressure areas moving eastward or northeastward, traversing the Lake Region and the St. Lawrence Valley, or the Ohio Valley and the North Atlantic States, and inducing southerly winds in the eastern States.

A file of weather maps for the years 1901 to 1927 was examined to discover the types of maps that produced the mild spells. In the 19 cases investigated it was found that lows (Alberta type) moving eastward over the Great Lakes and the St. Lawrence Valley produced 10 of the spells; lows coming from the far southwest and passing northeastward over the Ohio Valley or the Atlantic States caused 4; simultaneous movement of Alberta and southwestern (or Texas) lows caused 3; and lows that formed, or developed, over the Middle West or the Ohio Valley and moved northeastward caused the remaining 2.

NOTES AND ABSTRACTS

DISTRIBUTION OF BULLETINS OF THE MOUNT WEATHER OBSERVATORY

The Weather Bureau still possesses a number of the separate parts of Volumes I-VI of the above-named publication. Individuals, institutions and organizations lacking a complete file will be supplied with missing numbers so far as possible on application to Chief of Weather Bureau. Application for parts of any volume that may be desired will also be received and filled so far as the supply will permit.—*Editor*.

FURTHER NOTE ON "PROGRESS IN INTERNATIONAL METEOROLOGY"

Since the publication of the note under the above title in the November 1926 issue of this Review (p. 465), we have received the full text of the minutes of the eighth session of the International Committee on Intellectual Cooperation, held at Geneva in July, 1926. From this we reprint the whole of Annex 2, dealing with the—

QUESTION OF THE ESTABLISHMENT OF AN INTERNATIONAL BUREAU OF METEOROLOGY

Report by the Sub-Committee appointed at the Meeting of the International Committee on Intellectual Co-operation on July 29th, 1925, submitted to the Committee on July 26th, 1926.

At the Sixth Session of the International Committee on Intellectual Co-operation, held at Geneva from July 27th to July 29th, 1925, the Chairman communicated to the Committee a proposal submitted by M. van Everdingen, Director of the Netherlands Meteorological Observatory and Chairman of the International Meteorological Committee (I.M.C.), with regard to the creation of an International Bureau of Meteorology (I.B.M.) (Annex 4 to document C.445, M.165, 1925).

After a brief discussion, the Committee requested the undersigned to consider, together with M. van Everdingen and several other experts, how the Committee might assist in establishing this Bureau.

The present report sets out our conclusions:

M. van Everdingen's proposal was defined in a letter which General Delcambre, Director of the French Meteorological Service and Chairman of a special Committee set up by the International Meteorological Committee, addressed officially to the International Institute for Intellectual Co-operation on November 23rd, 1925.

The International Meteorological Committee is composed of the directors of the meteorological services of thirty countries (including Germany and Austria), who meet once every three years to